

# Diagnostic Test for Cattle Tuberculosis

**A** new test that detects cattle tuberculosis bacteria within 3 days is a major improvement over current methods that can take up to 3 months.

*Mycobacterium bovis*—the culprit in cattle tuberculosis—is similar to two other bacteria, *M. avium* and *M. paratuberculosis*. The inability to distinguish among the three has been a problem in eliminating the disease.

The new test, developed by ARS veterinarian Janice M. Miller at the National Animal Disease Center (NADC) in Ames, Iowa, allows researchers to quickly tell which organism has infected an animal. Miller developed the test at the request of USDA's Animal and Plant Health Inspection Service (APHIS). That agency needed the test to aid in joint efforts with state animal inspection agencies and U.S. livestock producers to eradicate cattle TB.

The test uses polymerase chain reaction (PCR), a technique that makes many copies of certain genetic material found only in *M. bovis*. Making so many copies of the targeted DNA allows easy identification of *M. bovis*, which couldn't be seen before PCR amplification. Extensive tests in other laboratories have proven that this piece of DNA isn't present in *M. avium* or *M. paratuberculosis*. Researchers recently developed new tests using the same technology to identify both of these organisms.

Miller and others at NADC and at APHIS' National

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Veterinary Services Laboratory in Ames validated the PCR test by examining 99 known cases of TB in cattle and elk. In 93 percent of the cases, they could make an accurate diagnosis within 2 to 3 days after receiving the tissue samples.

The speedier diagnosis will allow APHIS officials to take immediate action to identify the most common sources of cattle tuberculosis: imported Mexican steers, the captive elk and deer population, and large dairy herds with low levels of infection.

TB spreads when coughing releases the bacteria into the air.

Although human tuberculosis in the United States is usually caused by a different bacterium—*M. tuberculosis*—the *M. bovis* organism can cause TB in humans, and *M. tuberculosis* can cause TB in livestock and other animals.

Humans don't get TB from eating meat or drinking milk from infected animals because pasteurization and appropriate cooking temperatures kill the disease organism. When milk pasteurization standards were developed in the 1920s, *M. bovis* and *M. tuberculosis* were considered the most resistant pathogens then known.—By **Linda McGraw, ARS.**

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Using the new test for cattle tuberculosis, biological technician Dennis Orcutt loads an agar gel with PCR-amplified tissue material from the thermal cycler (foreground). He will know within 3 days if the culture contains *Mycobacterium bovis* bacteria.